

**AMENDMENTS TO THE CLAIMS:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A node for a network, the network comprising a hierarchical structure in which a node is considered to be at a higher level than a parent node to which it connects when joining the network, the network having a topology type in which each node joining the network is constrained by the same connection rules, the node being adapted to: (a) join the network by applying said connection rules, the rules comprising:

identifying a parent node at a lowest level in the network that is capable of maintaining able to maintain secondary connections to other nodes in the network of the same lowest level;

(b) requesting one of the secondary connections of the parent node to other nodes in the network of the same level to be terminated and reallocated to the node if the identified parent node has no free links to become a primary connection between the identified parent node and the node ;

(c) attempting to initiate and maintain a specified number  $k-1$  of further secondary connections between the node and other nodes in the network having the same level in the hierarchy as the node and which are advertising a spare connection thereby attempting to maintain  $k$  connections to each node.

2. (Cancelled).

3. (Currently Amended) A node according to claim 1, further adapted to attempt to maintain the specified number of  $k-1$  further connections between the node and other nodes in the network by periodically carrying out ~~the following step~~:

for each unallocated one of the  $k-1$  connections, selecting a node from one or more candidate nodes, and forming a connection with the selected node, until either the  $k-1$  further connections have been successfully completed or there are no more candidate nodes.

4. (Currently Amended) A node according to claim 3, wherein ~~the step of~~ selecting the peer node comprises selecting the peer node at random from the one or more candidate nodes.

5. (Currently Amended) A node according to claim 3, wherein ~~the step of~~ selecting the node comprises selecting the node on the basis of the range of the candidate nodes to the node.

6. (Original) A node according to claim 5, wherein the network comprises an overlay network formed over an underlying network of nodes, and wherein the range between a candidate node and the node comprises the number of links between them in the underlying network.

7. (Cancelled).

8. (Previously Presented) A node according to claim 1, further adapted to identify an other node as a prospective parent node on the basis of the range of the other node to the node.

9. (Currently Amended) A node according to claim 1, further adapted to identify ~~an other~~ another node as a prospective parent node if it is within a specified range of the node.

10. (Previously Presented) A node according to claim 1, further adapted, in the event that the primary connection fails, to re-establish a primary connection with another node which is at a lower level in the network hierarchy than the node.

11. (Currently Amended) A network, comprising a plurality of nodes each according to claim 1, in which the specified number ~~k-1~~k of connections is substantially the same for every node.

12. (Currently Amended) A method of ~~operating~~joining a node ~~into~~ a network, the network comprising a hierarchical structure in which a node is considered to be at a higher level than a parent node to which it connects when joining the network, the network having a topology type in which each node joining the network is constrained by the same connection rules, the method comprising applying said connection rules comprising:

(a) ~~joining the network by:~~

i. — identifying a parent node at a lowest level in the network that is capable of to maintaining secondary connections to other nodes in the network of the same lowest level;

ii. — requesting one of the secondary connections of the parent node to other nodes in the network of the same level as the parent node ~~to be~~ is terminated and reallocated to the node if the identified parent has no free links to become a primary connection between the identified parent node at the lower level in the network hierarchy and the node;

(b) attempting to initiate and maintain a specified number  $k-1$  of further connections between the node and other nodes in the network having the same level in the hierarchy as the node and which are advertising a spare connection thereby attempting to maintain  $k$  connections to each node.

13. (Cancelled).

14. (Currently Amended) A method according to claim 12, in which ~~the step of~~ attempting to maintain the specified number of  $k-1$  further connections to the other nodes in the network comprises periodically carrying out ~~the following step~~:

for each unallocated one of the  $k-1$  connections, selecting a node from one or more candidate nodes, and forming a connection with the selected node, until either the  $k-1$  further connections have been successfully completed or there are no more candidate nodes.

15. (Currently Amended) A method according to claim 12, in which ~~the step of~~ selecting the peer node comprises selecting the peer node at random from the one or more candidate nodes.

16. (Currently Amended) A method according to claim 14, wherein ~~the step of~~ selecting the node comprises selecting the node on the basis of the range of the candidate nodes to the node.

17. (Original) A method according to claim 16, wherein the network comprises an overlay network formed over an underlying network of nodes, and wherein the range between a candidate node and the node comprises the number of links between them in the underlying network.

18. (Cancelled).

19. (Currently Amended) A method according to claim 12, comprising identifying ~~an other~~ another node as a prospective parent node on the basis of the range of the other node to the node.

20. (Currently Amended) A method according to claim 12, comprising identifying ~~an other~~ another node as a prospective parent node if it is within a specified range of the node.

21. (Currently Amended) A method according to claim 12, further comprising ~~the step of~~, in the event that the primary connection to the identified parent fails, re-establishing a primary connection with another node which is at a lower level in the network hierarchy than the node.

22. (Previously Presented) A method of operating a network which comprises a plurality of nodes, the method comprising performing for every node the method according to claim 12, and in which the specified number  $k-1$  of connections is substantially the same for every node.

23. (Previously Presented) A tangible data store containing a computer program comprising instructions for causing one or more processors to operate as the node according to claim 1 when the instructions are executed by the processor or processors.

24. (Previously Presented) A storage medium carrying computer readable code representing instructions for causing one or more processors to operate as the node according to claim 1 when the instructions are executed by the processor or processors.

25. (Cancelled).

26. (Previously Presented) A tangible data store containing a computer program comprising instructions for causing one or more processors to perform the method according to claim 12 when the instructions are executed by the processor or processors.

27. (Previously Presented) A storage medium carrying computer readable code representing instructions for causing one or more processors to perform the method according to claim 12 when the instructions are executed by the processor or processors.

28. (Cancelled).

29. (Currently Amended) A node as claimed in claim 1, wherein the node is adapted to: upon receipt of a request from a further node desiring to form its primary connection with the node, and in the event that none of the  $k-1$  of further connections of the node is unallocated, ~~then to~~ to apply connection rules comprising:

selecting one of the further  $k-1$  connections which is not a primary connection for one of the other nodes; and

~~to re-allocate~~ re-allocating that selected further connection to the further node so as to form the primary connection for the further node.

30. (Currently Amended) A method as claimed in claim 12 wherein, upon receipt of a request from a further node desiring to form its primary connection with the node, and in the event that none of the  $k-1$  connections of the node is unallocated, the ~~method further comprising the steps of the node~~ applies connection rules comprising:

selecting one of the further connections which is not a primary connection for one of the other nodes; and

re-allocating that selected further connection to the further node so as to form the primary connection for the further node.

31. (New) A method of joining a node to a network, the network having a topology type in which each node joining the network is constrained by the same connection rules, wherein in order to join a new node to the network, the network comprising each node having at most  $k$  connections, the method applies the following connection rules;

identify the node with the lowest height in the network hierarchy that is maintaining horizontal connections or unallocated links;  
if the identified node has no free links, then request one of the horizontal connections to be terminated and re-allocated to the joining node, the link becoming vertical in the process,  
attempting to initiate  $k-1$  horizontal links between the joining node and other nodes in the network having the same height as the joining node and which are advertising a spare connection.